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(54) CONTROL PANEL FOR USE IN AN ULTRASONIC DIAGNOSTIC APPARATUS

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A61B 8/00 (2006.01)

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(57) **ABSTRACT**

The present invention relates to a control panel for use in an ultrasonic diagnostic apparatus, which enables a user to input various commands via one input device, thereby providing convenience in use. The ultrasonic diagnostic apparatus includes a control part for controlling operations thereof and the control panel is configured to transfer an input made by a user to the control part. The control panel comprises: a first input device having a pointing function or a scrolling function; and a second input device disposed around the first input device, the second input device having a plurality of input sections and generating a signal when the user manipulates each input section. A command corresponding to the signal from the second input device is key-mapped by the control part.

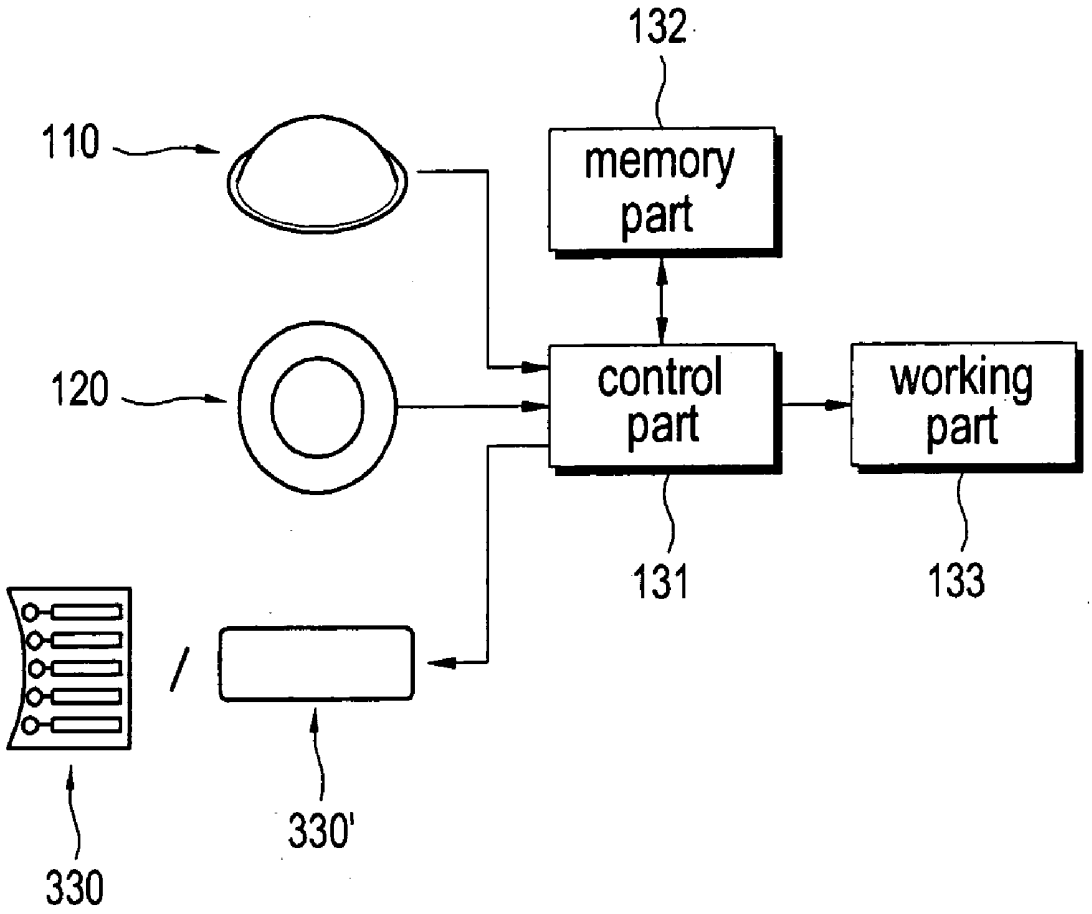


FIG. 1
(PRIOR ART)

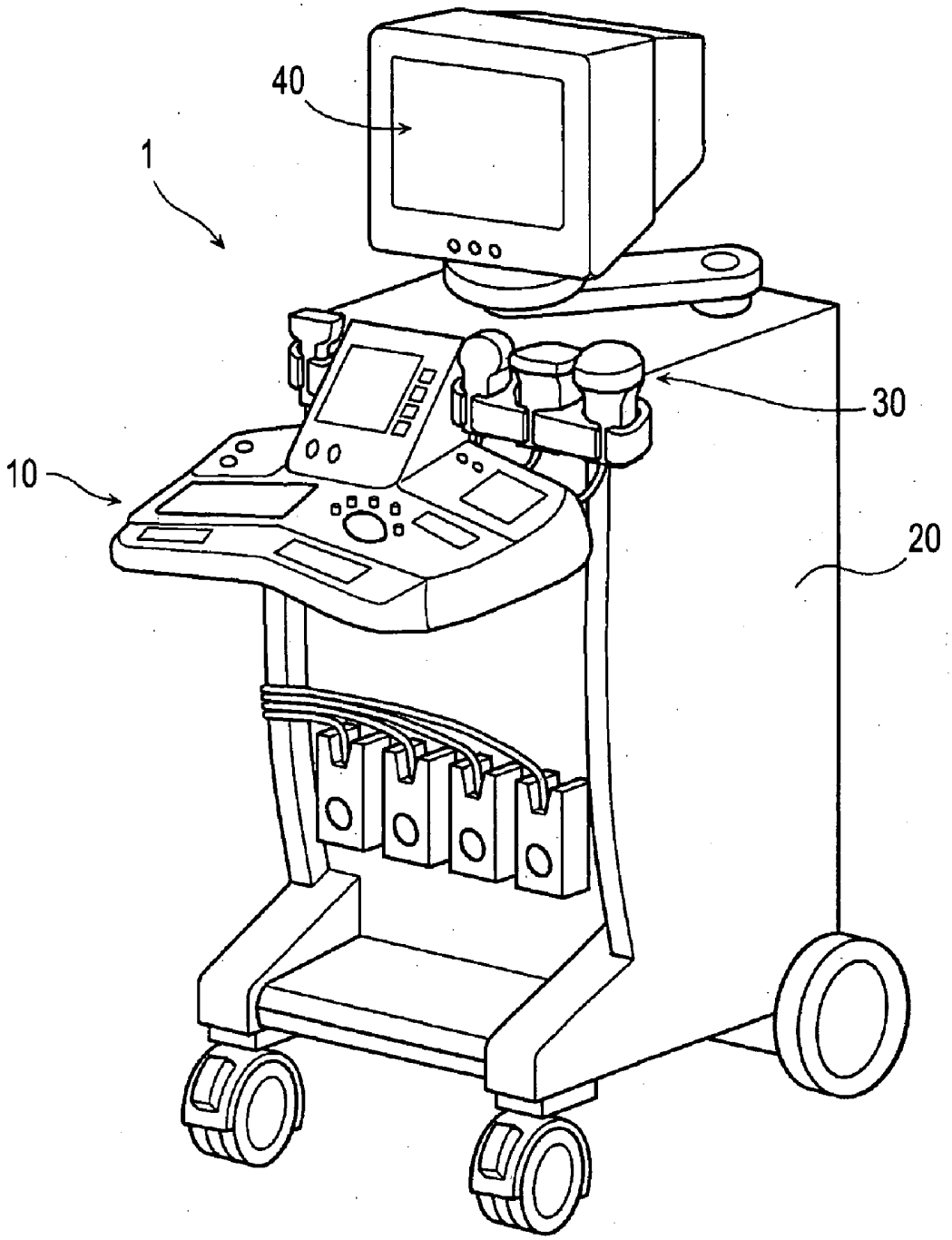


FIG. 2
(PRIOR ART)

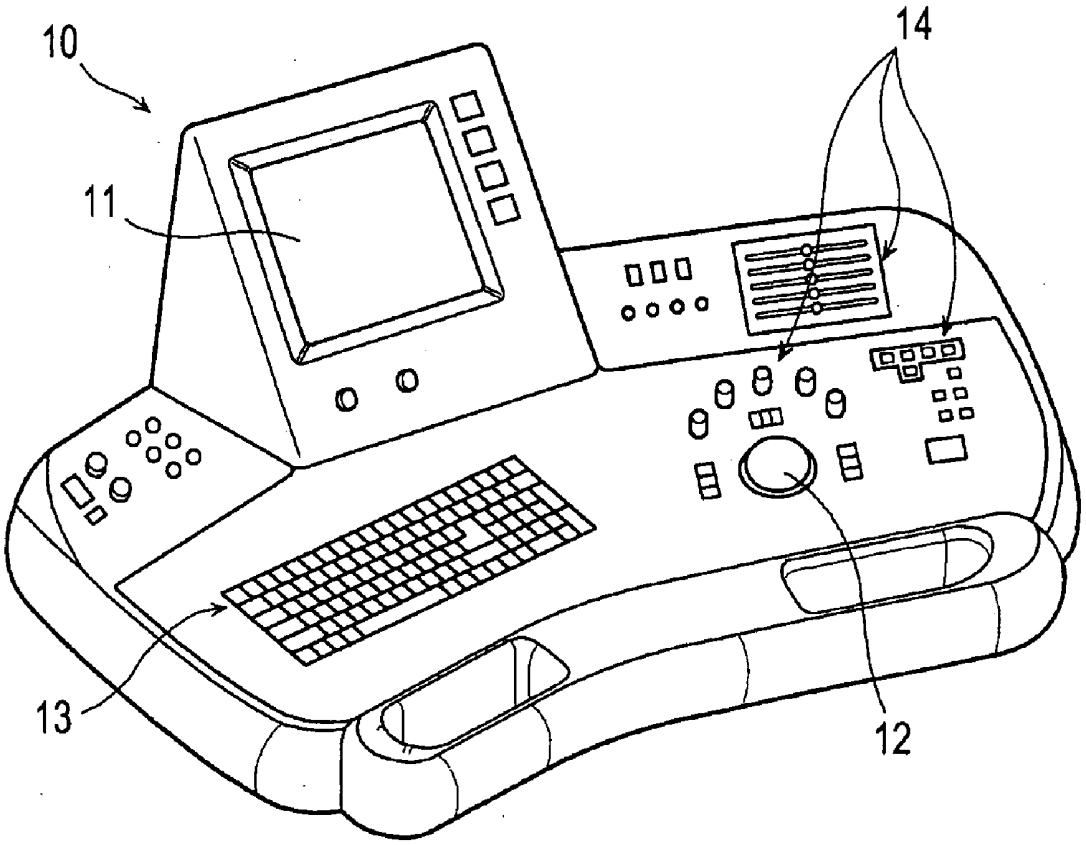


FIG. 3

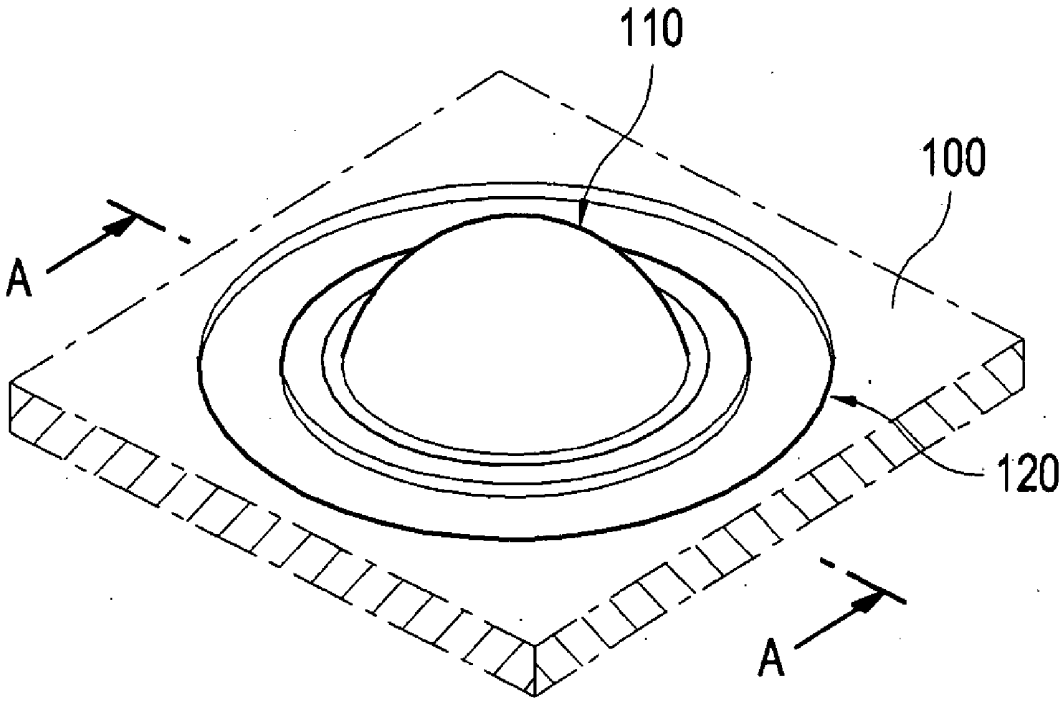


FIG. 4

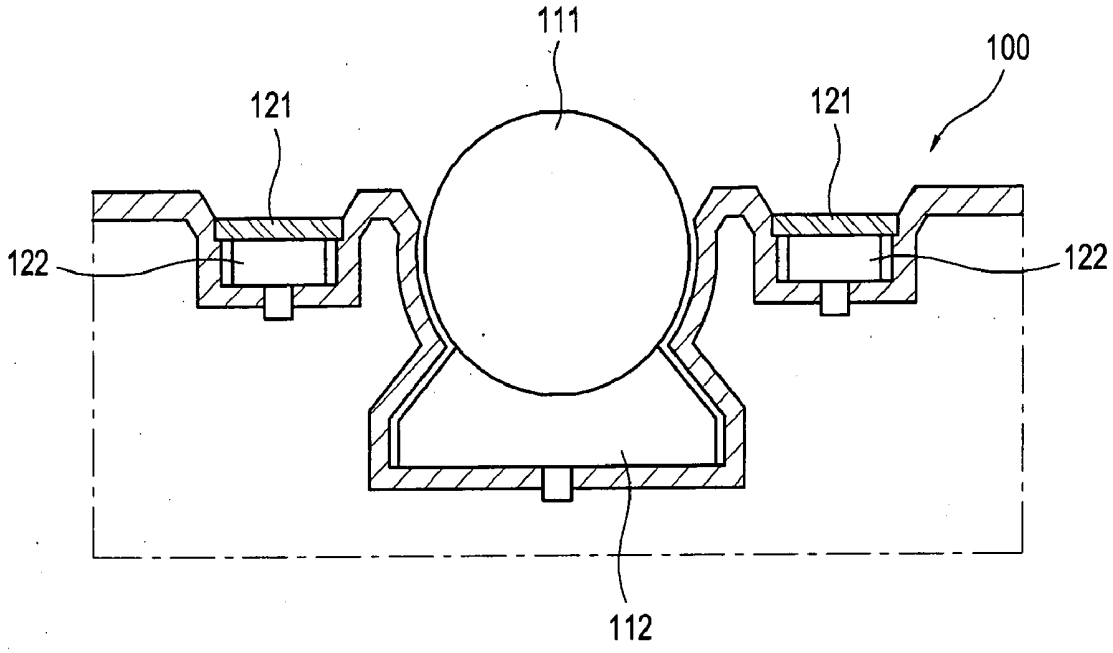


FIG. 5

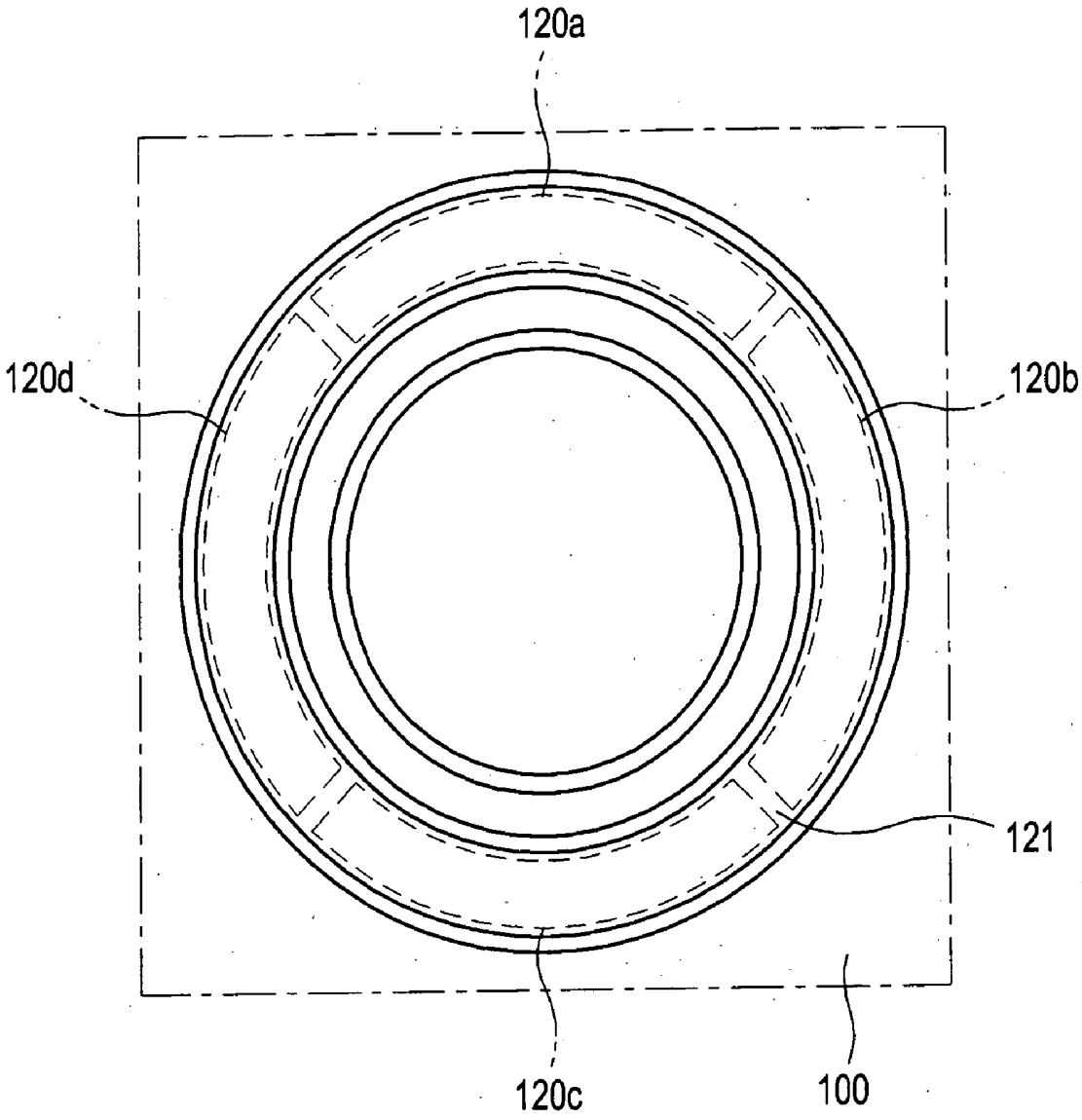


FIG. 6

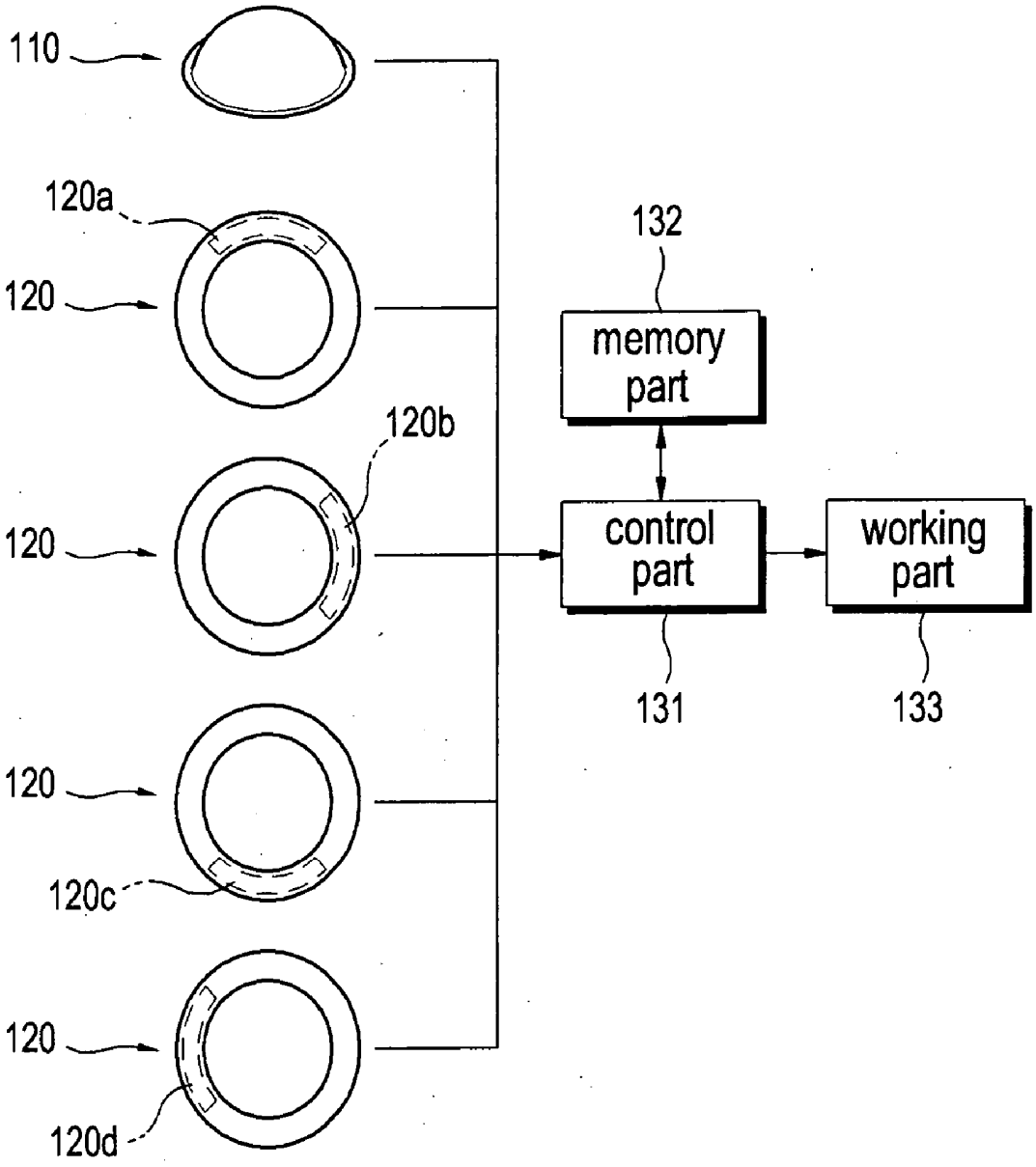

110
120a
120
120b
120
120
120c
120
120d
132
memory part
control part
working part
131
133

FIG. 7

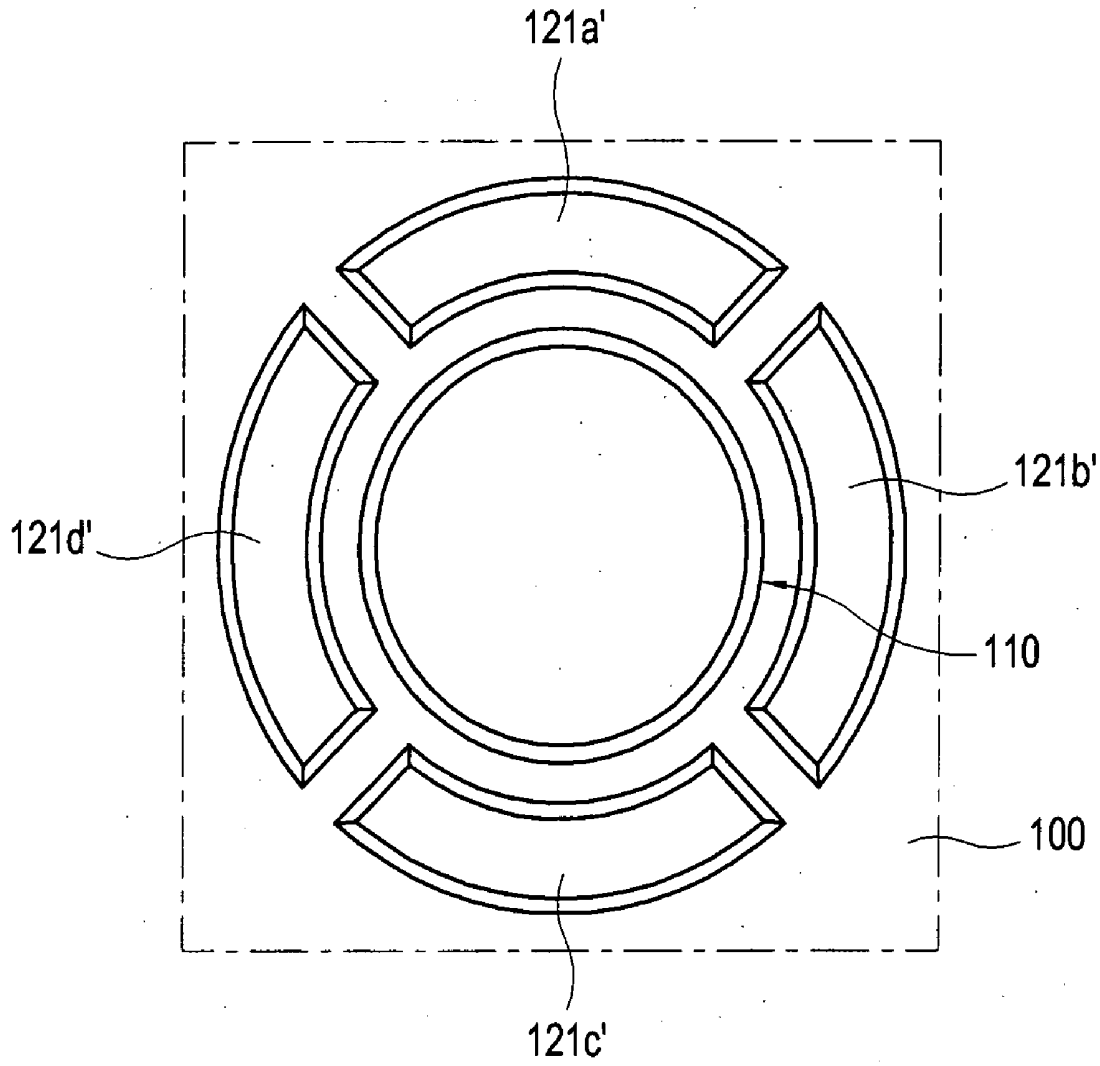


FIG. 8

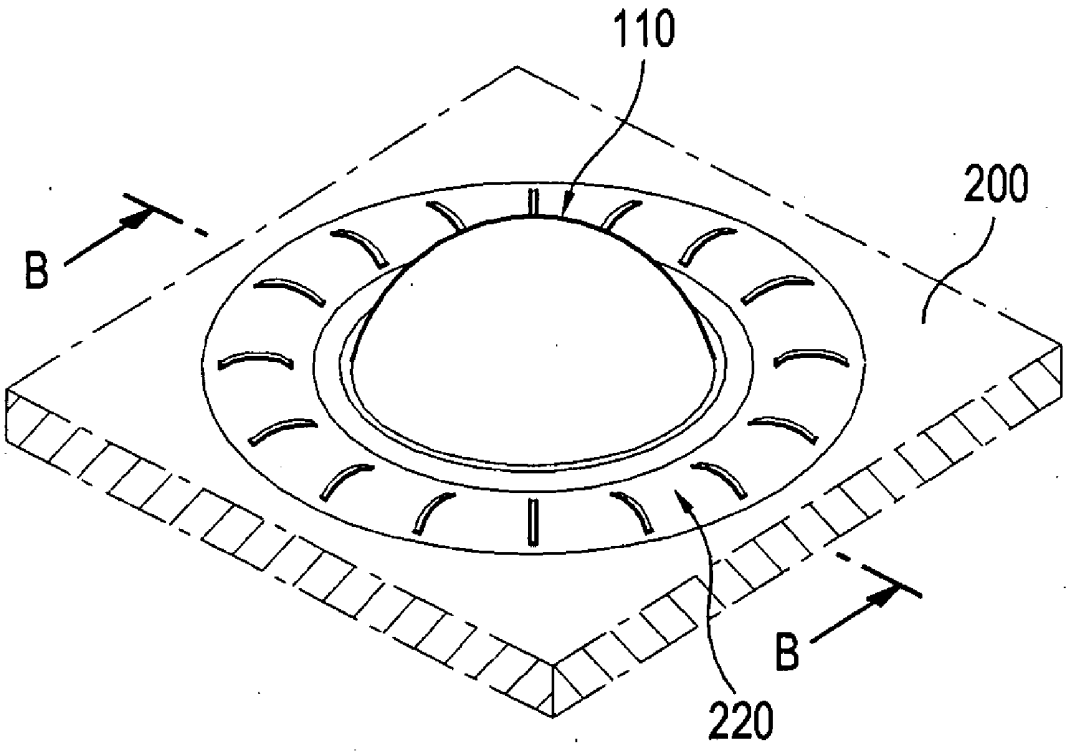


FIG. 9

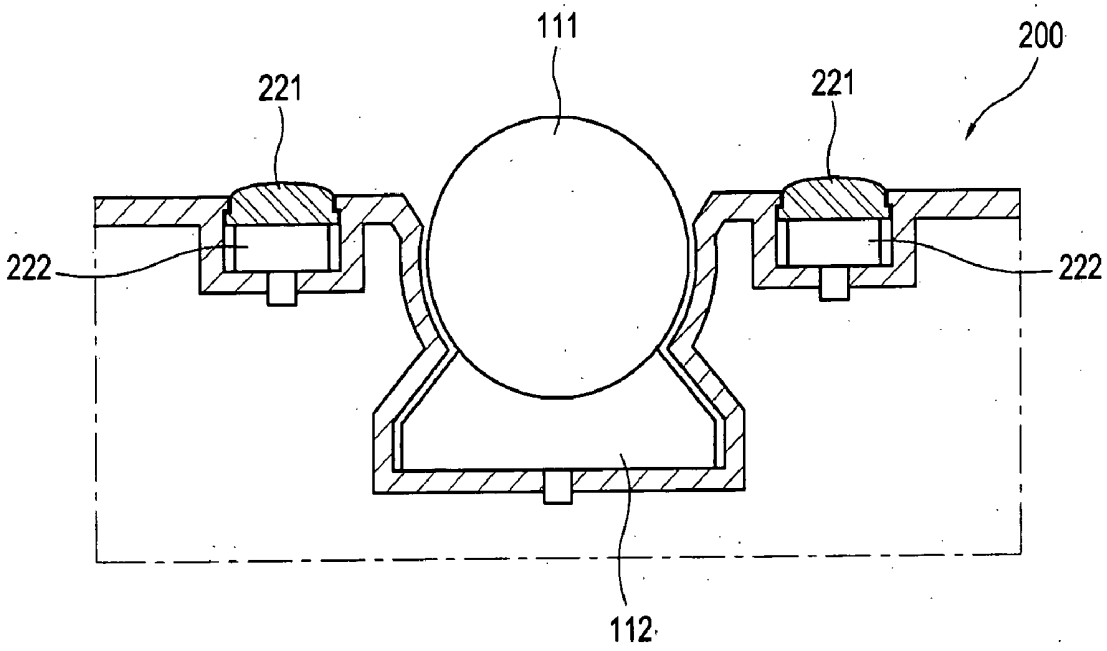


FIG. 10

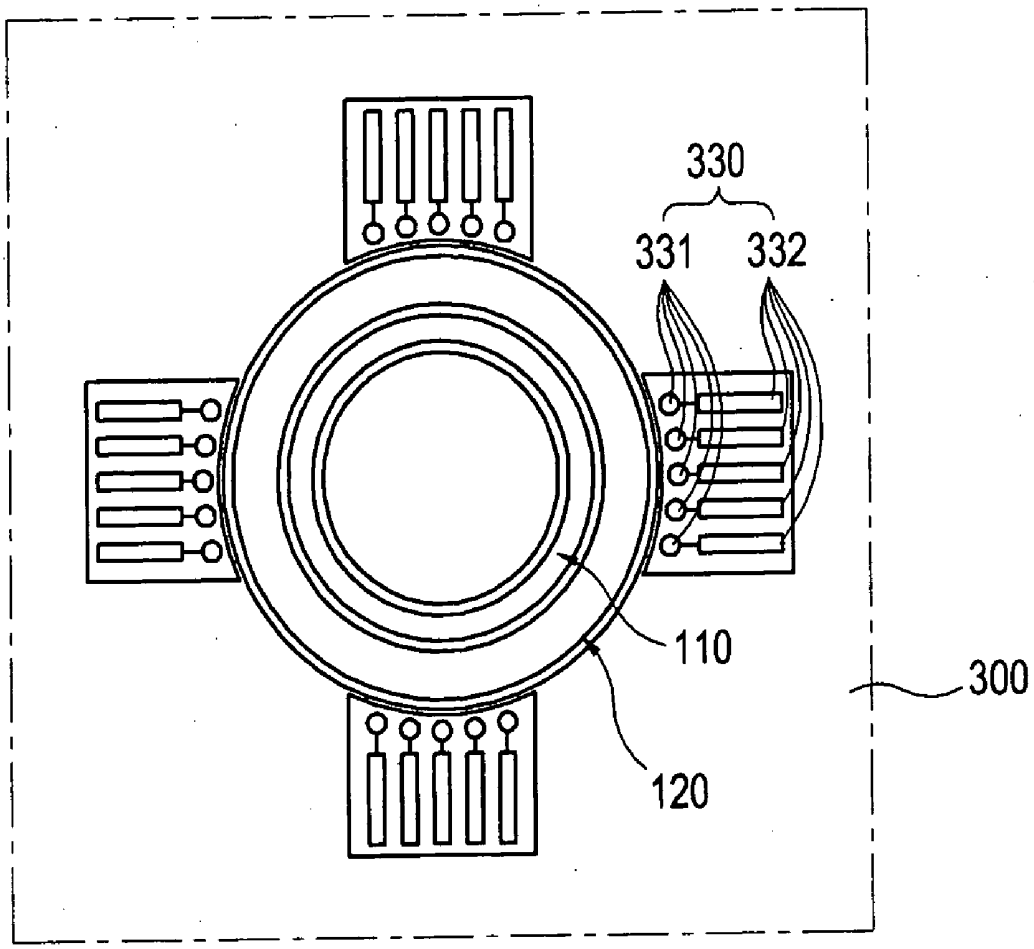


FIG. 11

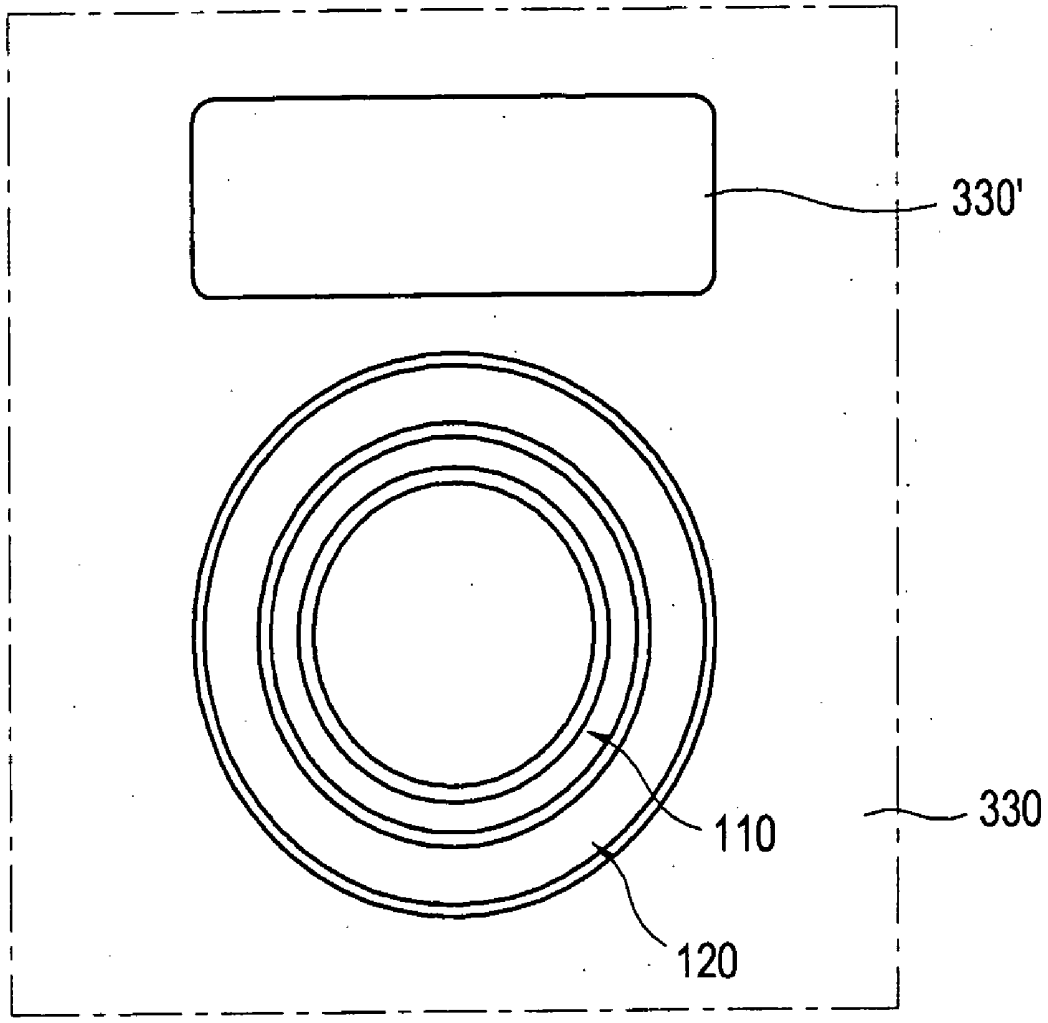
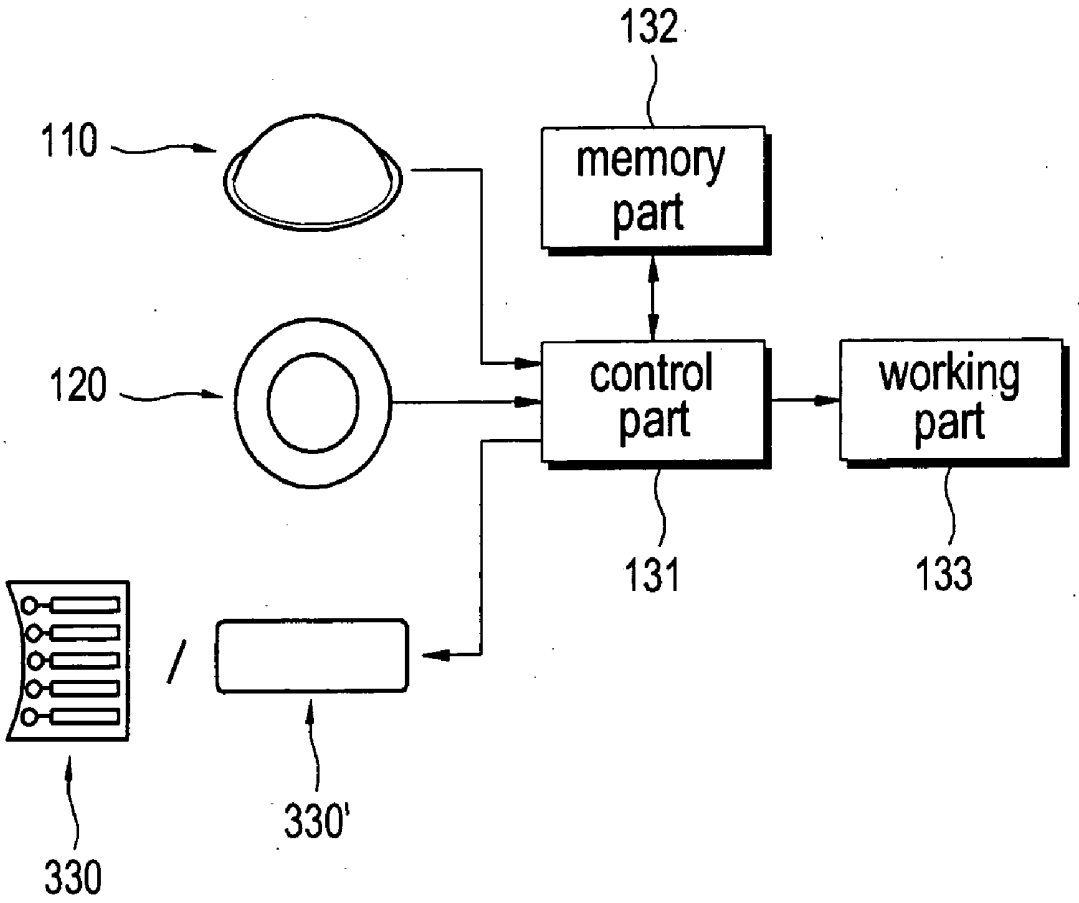


FIG. 12


132
110
memory part
120
control part
working part
131
133
330'
330

CONTROL PANEL FOR USE IN AN ULTRASONIC DIAGNOSTIC APPARATUS

FIELD OF THE INVENTION

[0001] The present invention generally relates to a control panel for use in an ultrasonic diagnostic apparatus, and more particularly to a control panel for use in an ultrasonic diagnostic apparatus that enables a user to input various commands by using one input device.

BACKGROUND OF THE INVENTION

[0002] An ultrasonic diagnostic apparatus is a medical device for obtaining an ultrasound image of a target region in an object. By obtaining such an image, clinical information of the target region (e.g., lesion or neoplasm information of internal organs, fetus information, etc.) can be provided.

[0003] FIG. **1** illustrates a conventional ultrasonic diagnostic apparatus **1**, which comprises: a main body **20**; a probe **30** for radiating an ultrasonic wave to a target region and receiving an echo signal reflected from the target region; a monitor **40** for displaying ultrasound images; and a control panel **10** for inputting commands.

[0004] FIG. **2** illustrates the control panel of the conventional ultrasonic diagnostic apparatus. The control panel **10** includes a touchscreen **11**, a trackball **12**, a keyboard **13**, a plurality of keys/terminals **14** and the like. For example, the touchscreen **11** displays the operating state of the conventional ultrasonic diagnostic apparatus **1** and generates a signal by a user's touch. The trackball **12** may be used for pointing or scrolling purposes. The keyboard **13** may be used for inputting letters or figures. The keys/terminals **14** may be used for selecting a diagnosis mode or adjusting output signals or ultrasound images.

[0005] When the user performs an ultrasonic diagnosis, the user generally holds the probe in one hand and moves the probe upon the skin of a patient. The user then generally manipulates the input devices (i.e., the touchscreen **11**, the trackball **12**, the keyboard **13** or the keys/terminals **14**) of the control panel **10** with the other hand.

[0006] However, since the input devices are scattered on the control panel, it is inconvenient and troublesome to manipulate the different types of input devices. Thus, performing the ultrasonic diagnosis can take a very long time.

SUMMARY OF THE INVENTION

[0007] The present invention provides a control panel of an ultrasonic diagnostic apparatus that enables a user to input various commands through one input device without needing to handle several input devices at once, thereby providing convenience in use.

[0008] In accordance with the invention as embodied broadly herein, there is provided a control panel for use in an ultrasonic diagnostic apparatus. The ultrasonic diagnostic apparatus includes a control part for controlling the operations thereof and the control panel is configured to transfer an input made by a user to the control part. The control panel comprises the following: a first input device having a pointing function or a scrolling function; and a second input device disposed around the first input device and having a plurality of input sections, the second input device being configured to generate a signal when the user manipulates each input section, wherein a command corresponding to the signal from the second input device is key-mapped by the control part.

[0009] In the present invention, the second input device includes: an annular pad disposed around the first input device; and at least one sensor disposed under the annular pad for generating the signal according to a pressure exerted to the annular pad and transferring the signal to the control part.

[0010] The second input device may further include: an annular dial disposed around the first input device; and a plurality of switches disposed under the annular dial for generating the signal when the annular dial contacts thereto and transferring the signal to the control part.

[0011] The control panel further comprises a device for indicating the command, which is key-mapped by the control part. The command-indicating device is controlled by the control part.

[0012] The command-indicating device includes: a plurality of LEDs positioned adjacent to the respective input sections; and a plurality of labels for representing the key-mapped command. Each label is provided on the control panel corresponding to each LED.

[0013] The command-indicating device includes a display device selected from the group consisting of a 7-segment display device, a dot matrix display device and a liquid crystal display device.

[0014] When the command, which corresponds to the signal from the second input device, is a diagnosis mode, the control part matches a subsequent signal from the second input device to a subcommand subordinate to the chosen diagnosis mode.

BRIEF DESCRIPTION OF DRAWINGS

[0015] The above features of the present invention will become more apparent from the following descriptions of the preferred embodiments given in conjunction with the accompanying drawings.

[0016] FIG. **1** is a perspective view illustrating a conventional ultrasonic diagnostic apparatus.

[0017] FIG. **2** is a perspective view illustrating a conventional control panel of the ultrasonic diagnostic apparatus shown in FIG. **1**.

[0018] FIG. **3** is a partial perspective view illustrating a control panel constructed in accordance with a first preferred embodiment of the present invention.

[0019] FIG. **4** is a schematic cross-sectional view along the line A-A in FIG. **3**.

[0020] FIG. **5** is a plan view of the control panel shown in FIG. **3**.

[0021] FIG. **6** is a block diagram illustrating the constitution of the control panel shown in FIG. **3**.

[0022] FIG. **7** is a partial plan view of the control panel showing an alternative configuration of a second input device.

[0023] FIG. **8** is a partial perspective view illustrating a control panel constructed in accordance with a second preferred embodiment of the present invention.

[0024] FIG. **9** is a schematic cross-sectional view along the line B-B in FIG. **8**.

[0025] FIGS. **10** and **11** are partial plan views of a control panel constructed in accordance with a third preferred embodiment of the present invention.

[0026] FIG. **12** is a block diagram illustrating the constitution of the control panel shown in FIGS. **10** and **11**.

DETAILED DESCRIPTION OF THE PRESENT INVENTION

[0027] The preferred embodiments of the present invention will now be described with reference to the accompanying drawings.

[0028] A control panel of the present invention is employed in an ultrasonic diagnostic apparatus. The ultrasonic diagnostic apparatus has a control part (not shown) for controlling the operations related to ultrasonic diagnosis. Alternatively, the control part may be provided in the control panel. The control panel of the present invention may have various input devices thereon, each of which can transfer an input made by the user to the control part as a signal. The input device may include a touchscreen, a trackball, a keyboard, keys, terminals and the like.

[0029] The control panel of the present invention further includes another input device, which is configured to have a plurality of input sections as well as to sense the input made by the user at each input section, thereby enabling a multiple input. Each signal from each input section can be matched to a specific command by the control part. Such function of the control part, wherein a specific command is performed in response to a specific signal by the control part, is generally known as "key-mapping."

[0030] FIG. **3** shows a partial perspective view of a control panel constructed in accordance with a first preferred embodiment of the present invention. FIG. **3** shows a portion of the control panel with another input device provided thereon. FIG. **4** shows a schematic cross-sectional view along the line A-A in FIG. **3**. FIG. **5** shows a plan view of the control panel shown in FIG. **3**.

[0031] Referring now to FIGS. **3** to **5**, the control panel **100** of the present invention comprises: a first input device **110** having a pointing function and/or a scrolling function; and a second input device **120** disposed around the first input device **110** and enabling a multiple input.

[0032] In the present invention, the first input device **110** is preferably a trackball input device. The first input device **110** has pointing and scrolling functions. The first input device **110** includes a ball **111** to be rolled by the user and a sensing part **112** disposed under the ball **111** for sensing the movement of the ball **111**. The sensing part **112** senses the movement of the ball **111** caused by the user and transfers a corresponding signal to the control part. The first input device **110** serves to move a pointer displayed on the touchscreen or scroll diagnostic records of a patient to be displayed on the touchscreen.

[0033] The second input device **120** can sense the user's touch or rubbing similar to a "touchpad." The second input device **120** includes: an annular pad **121** that can be touched or rubbed with the user's finger; and a sensing part **122** disposed under the annular pad **121** and generating a signal. The sensing part **122** is configured to sense the changes in pressure exerted onto the annular pad **121** when the user touches or rubs the annular pad **121** and to generate a signal corresponding thereto. As for the sensing part **122**, a plurality of sensors for sensing pressure may be disposed along the circumferential direction of the annular pad **121**. Alternatively, a single sensor, which has an annular shape similar to the annular pad **121** and is configured to sense pressure, may be disposed.

[0034] Since the second input device **120** is configured to have an annular shape, the second input device **120** can be divided into several input sections. The signals generated from the respective input sections of the second input device **120** are key-mapped by the control part and different commands corresponding to the signals are performed. Accordingly, the second input device **120** enables a multiple input. The second input device **120** will now be described in detail by way of an example in which it is divided into four input sections.

[0035] As shown in FIG. **5**, the second input device **120** includes four input sections **120***a* to **120***d*, through which at least four different inputs can be made. Also, four different commands can be performed by means of key-mapping of the control part. Accordingly, the user is relieved from the inconvenience of handling several input devices scattered on the control panel when operating the ultrasonic diagnostic apparatus.

[0036] FIG. **6** is a block diagram that illustrates the constitution of the control panel shown in FIG. **3**. When the user touches or rubs the surface of the annular pad **121** relating to the first input section **120***a* of the second input device **120**, the sensing part **122**, which is positioned under the annular pad **121** relating to the first input section **121**, senses an input made by the user. The sensing part **122** transfers a signal, which corresponds to such input, to the control part **131**. The control part **131** selects a command corresponding to the signal from the first input section **120***a* after interacting with a memory part **132** and then outputs the selected command to a working part **133**. As a result, the ultrasound diagnostic apparatus performs an operation that is associated with the selected command. The control part **131** is preset or programmed so as to match the signal from each input section to the command related thereto as well as to perform the selected command. The commands corresponding to the signals from the second input device **120** are saved in the memory part **132**. Such commands may be performed when the user handles various input devices (i.e., touchscreen, keyboard, keys, terminals, etc), which may be provided on the control panel **100**.

[0037] In actual ultrasonic diagnosis, the signal from any input section of the second input device **120** can be key-mapped so as to correspond to a command for choosing a diagnosis mode. In such a case, if the user chooses any one of the diagnosis modes, then the control part **131** can match each subsequent signal from each input section **120***a* to **120***d* to each subcommand subordinate to the chosen diagnosis mode. For example, in case any one of the diagnosis modes is chosen, the signal from the first input section **120***a* can be key-mapped so that the depth of an ultrasonic image can be

changed. Also, the signal from the second input section **120***b* can be key-mapped such that the zoom effect such as "zoom in" or "zoom out" can be provided. Further, the signal from the third or fourth input section **120***c* or **120***d* can be key-mapped such that the chosen mode may be changed into any other diagnosis mode. In the case of the depth change or zoom effect, these operations can be made when the user rubs the first or second input section **120***a* or **120***b* with his/her finger. Particularly, when the user touches the second input section **120***b*, all the input sections of the second input device **120** may be key-mapped once again such that "zoom in" or "zoom out" can be performed according to the rubbing direction.

[**0038**] FIG. **7** is a partial plan view of the control panel **100** showing an alternative configuration of the second input device **120**. A number of sectioned pads may be arranged around the first input device **110**. Referring now to FIG. **7**, four sectioned pads **121***a*' to **121***d*' are provided around the first input device **110** on the control panel **100**. Since four sectioned pads **121***a*' to **121***d*' are separately arranged around the first input device **110**, the user can handle each sectioned pad **121***a*' to **121***d*' with more definite touching sensations.

[**0039**] FIG. **8** is a partial perspective view illustrating a control panel, which is in accordance with a second preferred embodiment of the present invention. FIG. **9** is a schematic cross-sectional view along the line B-B in FIG. **8**.

[**0040**] In addition to the first input device **110**, the control panel **200** comprises a second input device **220** capable of sensing presses and turns caused by the user (similar to a "jog dial"). The second input device **220** includes a dial **221** having an annular disk shape and a sensing part **222** disposed along and under the dial **221**. Accordingly, in the present embodiment, the user makes inputs by pressing a portion of the dial **221** or turning the dial **221** in one direction.

[**0041**] The sensing part **222** comprises a plurality of switches, which can be activated to generate a signal when a portion of the dial **221** is pressed down by the user and contacts one or more switches.

[**0042**] Since the second input device **220** is configured to have an annular shape, the second input device **220** can be divided into several input sections. When the user presses down any portion of the dial **221** relating to any one of the input sections, the switch/switches **222** relating to the input section becomes activated to generate a signal. A command associated with such input section can then be performed through the key-mapping of the control part. Accordingly, the second input device **220** enables a multiple input. Also, when the second input device **220** is turned in one direction by the user, a signal related to the turning direction of the second input device **220** is generated, while some switches **222** are sequentially activated along the turning direction. Therefore, a command such as "zoom in", "zoom out" or depth change can be performed.

[**0043**] FIGS. **10** and **11** are partial plan views of a control panel, which is in accordance with a third preferred embodiment of the present invention. The control panel **300** of the present embodiment comprises: the first input device **110**; the second input device **120** disposed around the first input device **110** (as described above); and a command-indicating device **330** or **330**' disposed adjacent to the second input device **120** for indicating key-mapped commands when the user handles the second input device **120**.

[**0044**] The control panel **300** shown in FIG. **10** is provided with the command-indicating devices **330**, which are arranged adjacent to each input section of the second input device **120**. The command-indicating device **330** includes a plurality of LEDs **331** and a plurality of labels **332** attached to the control panel **300** so as to correspond to each LED. On each label **332**, words or symbols are printed to indicate a command, which can be performed through key-mapping when the user touches one of the input sections of the second input device **120**. If the user handles the second input device **120**, then the command associated with the input section of the second input device **120** is performed through key-mapping. At the same time, the LED, which corresponds to the label **332** having the words or symbols indicating such command, is turned on. Then, the user reads the words or symbols of the label adjacent to the LED. By doing so, it becomes possible to indicate the selected command.

[**0045**] The control panel **300** shown in FIG. **11** is provided with a command-indicating device **330**' such as a display device. The command-indicating device **330**' may be disposed adjacent to the second input device **120** or in any suitable place on the control panel **300** where the user can readily see it. The command-indicating device **330**' includes a 7-segment display device, a dot matrix display device or a liquid crystal display device. Accordingly, the command-indicating device **330**' can display the command, which is selected when the user handles the second input device **120**, as words or symbols. Particularly, when a liquid crystal display device is employed, since each selected command can be displayed as a symbol or an icon, the user can recognize the selected command more visually.

[**0046**] FIG. **12** is a block diagram showing the constitution of the control panel **300**, which is shown in FIGS. **10** and **11**. The command-indicating device **330** or **330**' is controlled by the control part **131**. When the signal is generated from any input section of the second input device **120**, the control part **131** activates the command-indicating device **330** or **330**' to thereby indicate the command selected through key-mapping. Alternatively, in case the control panel **300** is provided with the touchscreen **11** (shown in FIG. **2**), the control part **131** can enable the touchscreen **11** to directly display the selected command thereon without necessitating the command-indicating device **330** or **330**'.

[**0047**] As described above in detail, the control panel, which is in accordance with the present invention, enables a user to input various commands via one input device without needing to handle several input devices at once. Consequently, convenience in use is enhanced and rapid ultrasonic diagnosis can be provided.

[**0048**] While the present invention has been described and illustrated with respect to a preferred embodiment of the invention, it will be apparent to those skilled in the art that variations and modifications are possible without deviating from the broad principles and teachings of the present invention, which should be limited solely by the scope of the claims appended hereto.

What is claimed is:

1. A control panel for use in an ultrasonic diagnostic apparatus, the ultrasonic diagnostic apparatus including a

control part for controlling operations thereof and the control panel being configured to transfer an input made by a user to the control part,

the control panel comprising:

a first input device having a pointing function or a scrolling function; and

a second input device disposed around the first input device, the second input device having a plurality of input sections and generating a signal when the user manipulates each input section;

wherein a command corresponding to the signal from the second input device is key-mapped by the control part.

2. The control panel of claim 1, wherein the second input device includes: an annular pad disposed around the first input device; and at least one sensor disposed under the annular pad for generating the signal according to a pressure exerted to the annular pad and transferring the signal to the control part.

3. The control panel of claim 1, wherein the second input device includes: an annular dial disposed around the first input device; and a plurality of switches disposed under the annular dial for generating the signal when the annular dial contacts thereto and transferring the signal to the control part.

4. The control panel of claim 1, wherein the control panel further comprises a device for indicating the command key-mapped by the control part, the command-indicating device being controlled by the control part.

5. The control panel of claim 4, wherein the command-indicating device includes: a plurality of LEDs disposed adjacent to the respective input sections; and a plurality of labels for representing the key-mapped command, wherein each label is attached to the control panel corresponding to each LED.

6. The control panel of claim 4, wherein the command-indicating device includes a display device selected from the group consisting of a 7-segment display device, a dot matrix display device and a liquid crystal display device.

7. The control panel of claim 1, wherein when the command corresponding to the signal from the second input device is a diagnosis mode, the control part matches a subsequent signal from the second input device to a sub-command subordinate to the chosen diagnosis mode.

* * * * *

专利名称(译)	用于超声诊断设备的控制面板		
公开(公告)号	US20070083115A1	公开(公告)日	2007-04-12
申请号	US11/496445	申请日	2006-08-01
申请(专利权)人(译)	MEDISON CO.，LTD.		
当前申请(专利权)人(译)	MEDISON CO.，LTD.		
[标]发明人	LEE HONG GYO LEE DONG HYUN		
发明人	LEE, HONG GYO LEE, DONG HYUN		
IPC分类号	A61B8/00		
CPC分类号	A61B8/00 A61B8/4405 A61B8/467 G01S7/52084 G01S15/899 G06F3/03549 G06F3/0383 A61B8/461		
优先权	2020050022870 2005-08-08 KR 1020050084087 2005-09-09 KR		
外部链接	Espacenet USPTO		

摘要(译)

控制面板技术领域本发明涉及一种用于超声诊断设备的控制面板，其使用户能够通过一个输入设备输入各种命令，从而提供使用的便利性。超声诊断设备包括用于控制其操作的控制部分，并且控制面板被配置为将用户做出的输入传送到控制部分。控制面板包括：第一输入设备，具有指向功能或滚动功能;第二输入装置设置在第一输入装置周围，第二输入装置具有多个输入部分，并在用户操作每个输入部分时产生信号。对应于来自第二输入设备的信号的命令由控制部分进行键映射。